

## ARIZONA POLLUTANT DISCHARGE ELIMINATION SYSTEM (AZPDES)

This document gives pertinent information concerning the reissuance of the AZPDES permit listed below. This facility is a fish hatchery and has a maximum flow rate of 3,750,000 gallons per day (3.75 mgd). Due to the nature of the discharge, it has been determined to be a minor facility under the NPDES program. The discharge limitations contained in this permit will maintain the Water Quality Standards listed in Arizona Administrative Code (A.A.C.) R18-11-101 et. seq. This permit is proposed to be issued for a period of 5 years.

Permittee's Name:	Arizona Game and Fish Department (AZGFD)
Permittee's Mailing Address:	5000 W. Carefree Highway Phoenix, Arizona 85086
Facility Name:	Canyon Creek Fish Hatchery (CCFH)
Facility Address or Location:	Young Road south from State Highway 260, three miles to Forest Road 33, turn left, five miles to hatchery.
County:	Gila
Contact Person(s): Phone/e-mail address	Marc Dahlberg, Water Quality Program Manager (623) 236-7260, mdahlberg@azgfd.gov
AZPDES Permit Number:	AZ0021229
Inventory Number:	101555

<b>I. STATUS OF PERMIT(s)</b>	
AZPDES permit applied for:	Renewal
Date application received:	October 22, 2015
Date application was determined administratively complete:	November 21, 2017
Previous permit expiration date:	April 27, 2016
<b><u>208 Consistency:</u></b>	
208 Plan consistency is not required for industrial facilities.	

The AZGFD has the following permits issued by ADEQ applicable to the CCFH:

Type of Permit	Permit Number	Purpose
Aquifer Protection Permit (APP)	P-101555	Regulates discharges to the local aquifer

## II. GENERAL FACILITY INFORMATION

Type of Facility:	The CCFH was established for the production of fingerling and catchable trout that are distributed in the Mogollon Rim and White Mountain waters. This hatchery does not produce warm water species.
Facility Location Description:	The facility is located on Forest Service Road 33, approximately five miles south of Young Road and approximately 39 miles east of Payson, Arizona, in the Tonto National Forest.
Estimated Flow:	Flow-through fish hatchery with a maximum flow rate of 3.75 million gallons per day (mgd)
Treatment Processes (include sludge handling and disposal/use):	There is no treatment given to the water. Fish waste is not considered a biosolid under the 40 CFR 503 provisions.
Nature of facility discharge:	This is a flow-through hatchery that diverts some, but not all, of the water from the spring for use in the facility's rearing operation and then discharges at the end of the process back into the stream.
Average flow per discharge:	2.63 mgd
Continuous or intermittent discharge:	Continuous
Discharge pattern summary:	Daily maximum flow rate is approximately 3.75 mgd per day. Discharge to the stream is continuous through a single outflow structure.

## III. RECEIVING WATER

The State of Arizona has adopted water quality standards to protect the designated uses of its surface waters. Streams have been divided into segments and designated uses assigned to these segments. The water quality standards vary by designated use depending on the level of protection required to maintain that use.

Receiving Water :	Canyon Creek, tributary to the Salt River from the headwaters to the White Mountain Apache Reservation.
River Basin:	Salt River Basin
Outfall Location(s):	Outfall 001: Township 11 N, Range 14 E, Section 36 Latitude 34° 17' 25", Longitude 110° 48' 26"
The outfall discharges to, or the discharge may reach, a surface water listed in Appendix B of A.A.C. Title 18, Chapter 11, Article 1.	

Designated uses for the receiving water listed above:	Aquatic and Wildlife cold water (A&Wc) Full Body Contact (FBC) Fish Consumption (FC) Agricultural Irrigation (AgI) Agricultural Livestock watering (AgL) Domestic Water Supply (DWS)
Applicable nutrient standards A.A.C. R18-11-109.F.3	The Salt River and its perennial tributaries above Roosevelt Lake for any segments that are not located on tribal lands. A total nitrogen annual mean of 0.60 mg/L and single sample maximum of 2.0 mg/L. A total phosphorus annual mean of 0.12 mg/L and single sample maximum of 1.0 mg/L.
Is the receiving water on the 303(d) list?	No, and there are no TMDL issues associated.
Given the uses stated above, the applicable narrative water quality standards are described in A.A.C. R18-11-108, and the applicable numeric water quality standards are listed in A.A.C. R18-11-109 and in Appendix A thereof. There are two standards for the Aquatic and Wildlife uses, acute and chronic. In developing AZPDES permits, the standards for all applicable designated uses are compared and limits that will protect for all applicable designated uses are developed based on the standards.	

#### IV. DESCRIPTION OF DISCHARGE

Because the facility is in operation and discharges have occurred, effluent monitoring data are available. The following is the measured effluent quality reported in the application.

Parameters	Units	Maximum Daily Discharge Concentration
Total Suspended Solids (TSS)	mg/L	13.6
Total Nitrogen	mg/L	0.97
Total Phosphorus	mg/L	0.16

#### V. STATUS OF COMPLIANCE WITH THE EXISTING AZPDES PERMIT

Date of most recent inspection:	August 29, 2013; no potential violations were noted as a result of this inspection.
DMR files reviewed:	January 2013 through December 2016
Lab reports reviewed:	January 2013 through December 2016
DMR Exceedances:	There were no exceedances of the interim limits for nitrogen or phosphorus
NOVs issued:	None
NOVs closed:	N/A
Compliance orders:	None

## VI. PROPOSED PERMIT CHANGES

The following table lists the major changes from the previous permit in this draft permit.

Parameter	Existing Permit	Proposed permit	Reason for change
Reporting Location	Mail in hard copies of DMRs and other attachments	DMRs and other reports to be submitted electronically through myDEQ portal	Language added to support the NPDES electronic DMR reporting rule that became effective on December 21, 2015.
Nitrogen	Variance granted with interim limit for annual mean of 0.85 mg/L	Variance was not renewed - a mixing zone is granted.	A mixing zone was applied for and approved.
Phosphorus	Variance granted with interim limit for annual mean of 0.15 mg/L	Variance was not renewed - a mixing zone is granted.	A mixing zone was applied for and approved.
Dissolved oxygen	Not included in ambient monitoring	Included in ambient monitoring	Provides additional information regarding stream health
Best Management Practices (BMPs)	Actions taken with regards to Hatchery specific BMPs are reported in the Annual Report	Includes a list of the BMPs in the permit	BMPs are critical for nutrient control

Anti-backsliding considerations – “Anti-backsliding” refers to statutory (Section 402(o) of the Clean Water Act) and regulatory (40 CFR 122.44(l)) requirements that prohibit the renewal, reissuance, or modification of an existing NPDES permit that contains effluent limits, permit conditions, or standards that are less stringent than those established in the previous permit. The rules and statutes do identify exceptions to these circumstances where backsliding is acceptable. This permit has been reviewed and drafted with consideration of anti-backsliding concerns.

No limits have been removed from the permit. In these cases, limits will be recalculated using the most current Arizona Water Quality Standards (WQS). If less stringent limits result due to a change in the WQS then backsliding is allowed in accordance with 303(d)(4) if the new limits are consistent with antidegradation requirements and the receiving water is in attainment of the new standard; see Section XII for information regarding antidegradation requirements. There are no limits that are less stringent due to a change in the WQS in this permit.

## VII. DETERMINATION OF EFFLUENT LIMITATIONS and ASSESSMENT LEVELS

When determining what parameters need monitoring and/or limits included in the draft permit, both technology-based and water quality-based criteria were compared and the more stringent criteria applied.

**Technology-based Limitations:** As outlined in 40 CFR Part 133:

This fish hatchery is regulated under 40 CFR 122.24 as a concentrated aquatic animal production facility and is not an animal or concentrated animal feeding operation (AFO or CAFO, respectively). There are no promulgated technology-based limitations for fish hatcheries. The total suspended solids (TSS) discharge

limitations in the current permit are based on best professional judgment (BPJ) and are included in this renewal permit.

The regulations at 40 CFR Part 451 became effective September 22, 2004, and apply to the discharge of pollutants from a concentrated aquatic animal production facility that produces 100,000 pounds or more per year of aquatic animals in a flow-through or recirculating system. Canyon Creek fish hatchery produces 92,394 pounds per year in a flow-through system. AZGF has implemented a BMP plan consistent with the discharge limitation guidelines applicable in 40 CFR 451 at the Canyon Creek Hatchery. ADEQ has therefore established permit requirements based upon Best Practicable Technology (BPT) and Best Available Technology (BAT) discharge limitation guidelines, which have been incorporated into the proposed permit.

**Numeric Water Quality Standards:**

Few contaminants are introduced in the rearing process. Based on the designated uses for this segment of Canyon Creek, ammonia, phosphorus and nitrogen are considered to be the only pollutants of concern due to the fish feed and waste products. Phosphorus and nitrogen data indicate reasonable potential for exceedances of the applicable standards, and limits are set.

In previous years, additional data submitted indicated that ammonia monitoring was unnecessary for the following reasons. Total Kjeldahl Nitrogen (TKN) is the sum of the organic nitrogen and total ammonia, which means that the ammonia concentrations in the samples must be equal to or less than the TKN concentrations. Based on the TKN data and the Ammonia Data Logs provided at the time, the TKN measured in the CCFH outflow was much lower than the ammonia standards for the corresponding pH and temperature. In addition, the total nitrogen standard (nitrate + nitrite + organic nitrogen + ammonia) applicable to the discharge was lower than the ammonia standard calculated using pH and temperature. Therefore, the total nitrogen standard would be exceeded before the ammonia standard is even approached and, therefore, ammonia sampling is not required in the draft permit.

**Mixing Zone:** The nitrogen and phosphorus annual mean limits in this permit were determined with the use of a mixing zone. Arizona state water quality rules require that water quality standards be achieved without mixing zones unless the permittee applies for and is approved for a mixing zone. The permittee applied for and is granted a mixing zone for nitrogen and phosphorus. See Part IV.A. in the permit.

ADEQ evaluated the request and approved the establishment of the nitrogen and phosphorus mixing zone. The following factors in Arizona mixing zone rules listed in A.A.C. R18-11-114(D) were considered upon approving the request:

Mixing Zone Factor	Consideration
Assimilative capacity of the receiving water	ADEQ has completed field water quality analysis of the stream below the hatchery outfall. The pH, DO and % plant cover on the streambed indicate the nutrients are not negatively affecting the water quality of the stream.
Likelihood of adverse human health effects	As per A.A.C. R18-11-109F.3, nutrient standards are applied to the Salt River and its perennial tributaries

	above Roosevelt Lake. The annual mean surface water standard of 0.60 mg/L is well below the drinking water standard for nitrate plus nitrite of 10 mg/L.
Location of drinking water plant intakes and public swimming areas	The nitrogen concentrations in the effluent are well below the FBC and DWS standards.
Predicted exposure of biota and the likelihood that resident biota will be adversely affected	The likelihood of adverse effects is low, given in-stream measurements of % plant cover on the stream bed in this study reach.
Bioaccumulation	Nitrogen and phosphorus are not toxics and don't bioaccumulate.
Size of the zone of initial dilution	Due to the location of the outfall immediately downstream of the portion of the stream that flows around the hatchery - rapid and complete mixing will occur.
Known or predicted safe exposure levels for the pollutant for which the mixing zone is granted	Effluent concentrations are well below safe exposure levels for nitrogen and phosphorus.
Size of the mixing zone	Rapid and complete mixing is assumed downstream of the outfall. The permittee will continue to sample the ambient surface water at 500 meters downstream of the outfall.
Location of the mixing zone relative to biologically sensitive areas in the surface water	A complete and rapid mix is assumed at the discharge point with the downstream concentration being below the aquatic and wildlife standard 500 meters downstream, where hatchery trout are stocked regularly.
Concentration gradient of the pollutant within the mixing zone	A complete and rapid mix is assumed
Sediment deposition	None
Potential to attracting aquatic life to the mixing zone	None
Cumulative impacts of other mixing zones and other discharges to the surface water	Not applicable

Complete mixing is assumed at the confluence of the hatchery discharge and Canyon Creek because of the stream flow dynamics and mixing that occur at this location. Therefore, the steady state dilution model is used to calculate the mixing zone. Based on previous nitrogen and phosphorus ambient data, there is a reasonable potential for nitrogen and phosphorus to exceed the standard. The following steady-state mass balance formula was used to determine the end-of-pipe limits in consideration of the applicant's request for a mixing zone:

$$Q_s C_s + Q_d C_d = Q_r C_r$$

Where:  $Q_s$ =stream flow above discharge point;  $C_s$ =background in-stream concentration;  $Q_d$ =effluent flow;  $C_d$ = effluent concentration;  $Q_r$ = resultant in-stream flow after discharge; and  $C_r$ =resultant in-stream concentration after complete mixing.

AZGF collects flow and nutrient concentration data from the hatchery discharge and 500 meters downstream. The following data represent the annual averages of the data submitted since 2013. The annual average data was used for all the critical flow and concentration data inputs in the model. The basis for this decision is that both the phosphorus and nitrogen standards are prescribed as an annual mean in the Arizona water quality standards rule.

See also the Appendix A in the factsheet for a further breakdown of the data.

#### Nitrogen Data:

**Q<sub>s</sub> = 2.80 CFS** : calculated from downstream measurements (Q<sub>r</sub>) taken by ADEQ and discharge data from hatchery (Q<sub>d</sub>). ( $Q_s = Q_r - Q_d$ )

**C<sub>s</sub> = 0.24 mg/L** : Annual average data obtained from annual reports

**Q<sub>d</sub> = 3.96 CFS** : Annual average data obtained from annual reports

**C<sub>d</sub> = 0.72 mg/L** : Annual average data obtained from annual reports

**Q<sub>r</sub> = 6.77 CFS** : Field measurements taken by ADEQ

**C<sub>r</sub> = 0.60 mg/L** : Annual average data obtained from annual reports

Model calculated end-of-pipe nitrogen limit

$C_d = ((Q_r C_r - Q_s C_s)) / Q_d$

**C<sub>d</sub> = 0.86 mg/L \*\***

\*\* The Nitrogen limit in the previous permit was 0.85 mg/L, which was an interim limit based on a variance. A variance was not approved in this permit. The mass-balance results of C<sub>d</sub> based on the annual average flow data was 0.86 mg/L. Because the current downstream nitrogen concentration (C<sub>r</sub> = 0.60 mg/L) is on average at the standard, ADEQ will cap the mixing zone N limit at 0.85 mg/L - the same limit as in the previous permit.

#### Phosphorus Data:

**Q<sub>s</sub> = 2.80 CFS**: calculated from downstream measurements (Q<sub>r</sub>) taken by ADEQ and discharge data from hatchery (Q<sub>d</sub>). ( $Q_s = Q_r - Q_d$ )

**C<sub>s</sub> = 0.05 mg/L** : Annual average data obtained from annual reports

**Q<sub>d</sub> = 3.96 CFS**: Annual average data obtained from annual reports

**C<sub>d</sub> = 0.12 mg/L**: Annual average data obtained from annual reports

**Q<sub>r</sub> = 6.77 CFS** : Field measurements taken by ADEQ

**C<sub>r</sub> = 0.09 mg/L** : Annual average data obtained from annual reports

Model calculated end-of-pipe phosphorus limit

$C_d = ((Q_r C_r - Q_s C_s)) / Q_d$

**C<sub>d</sub> = 0.13 mg/L \*\***

\*\* The Phosphorus limit in the previous permit was 0.15 mg/L, which was an interim limit based on a variance. A variance was not approved in this permit. The mass-balance results of C<sub>d</sub> based on the annual average flow data was 0.13 mg/L. Because the current downstream phosphorus concentration (C<sub>r</sub> = 0.09 mg/L) is on average below the standard, ADEQ will establish the mixing zone P limit at 0.15 mg/L - the same limit as in the previous permit.

**Permit Limitations and Monitoring Requirements:**

The table that follows summarizes the parameters that are limited in the permit and the rationale for that decision. Also included are the parameters that require monitoring without any limitations or that have not been included in the permit at all and the basis for those decisions. The corresponding monitoring requirements are shown for each parameter. In general, the regulatory basis for monitoring requirements is per 40 CFR §122.44(i) *Monitoring requirements*, and 40 CFR §122.48(b), *Required monitoring*; all of which have been adopted by reference in A.A.C. R18-9-A905, *AZPDES Program Standards*.



Parameter	Lowest Standard / Designated Use	Maximum Reported Daily Value	No. of Samples	Estimated Maximum Value	RP Determination	Proposed Monitoring Requirement/ Rationale (1)
Total Suspended Solids (TSS)	15 mg/L maximum daily 10 mg/L average monthly Best Professional Judgment (BPJ)	11 mg/L	35	N/A	N/A	A January 2002 EPA memo indicated that settleable solids monitoring was no longer required as long as TSS monitoring is required. TSS is therefore set as a TBEL in the permit based on BPJ.
pH	Minimum: 6.5 Maximum: 9.0 A&Wc A.A.C. R18-11-109(B)	8.8 S.U.	35	N/A	N/A	pH is to be monitored using a discrete sample of the discharge and a WQBEL is set. 40 CFR Part 136 specifies that grab samples must be collected for pH.
Total Nitrogen	Annual Mean Nitrogen: 0.60 mg/L Single Sample Maximum: 2.0 mg/L A.A.C. R18-11-109F.3	TN – 0.97 mg/L	31	N/A	RP Exists	Mixing Zone established.
Total Phosphorus	Annual Mean Phosphorus: 0.12 mg/L Single Sample Maximum: 1.0 mg/L A.A.C. R18-11-109F.3	TP – 0.16 mg/L	31	N/A	RP Exists	Mixing Zone established.

Footnotes:

(1) The monitoring frequencies are as specified in the permit.

## VIII. NARRATIVE WATER QUALITY STANDARDS

All narrative limitations in A.A.C. R18-11-108 that are applicable to the receiving water are included in Part I, Sections B and C of the draft permit.

## IX. MONITORING AND REPORTING REQUIREMENTS (Part II of Permit)

Section 308 of the Clean Water Act and 40 CFR Part 122.44(i) require that monitoring be included in permits to determine compliance with effluent limitations. Additionally, monitoring may be required to gather data for future effluent limitations or to monitor effluent impacts on receiving water quality.

Monitoring frequencies are based on the nature and effect of the pollutant, as well as a determination of the minimum sampling necessary to adequately monitor the facility's performance.

For the purposes of this permit, discrete (i.e., grab) samples are specified in the permit for all parameters. The quality of the discharge is not expected to be highly variable.

Monitoring locations are specified in the permit (Part I.G and Part IV.A) in order to ensure that representative samples of the fish hatchery process water discharge are consistently obtained. Piping from three close springs are combined in a juncture box, also known as the spring box. The spring water is split out in the box with some going through the hatchery and some bypassing the hatchery and continuing on as Canyon Creek. This spring box is the sole water source for the hatchery. However, since the hatchery is required to allow spring water to flow perennially in Canyon Creek, an open four inch pipe from the spring box allows water to run continuously in the wash. The portion of the water diverted through the hatchery from the spring box is used in the process and then discharged to the Canyon Creek at the discharge point, which is Outfall 001.

The requirements in the permit pertaining to Part II, Monitoring and Reporting, are included to ensure that the monitoring data submitted under this permit is accurate in accordance with 40 CFR 122.41(e). The permittee has the responsibility to determine that all data collected for purposes of this permit meet the requirements specified in this permit and is collected, analyzed, and properly reported to ADEQ.

The permit (Part II.A.2) requires the permittee to keep a Quality Assurance (QA) manual at the facility, describing sample collection and analysis processes; the required elements of the QA manual are outlined.

Reporting requirements for monitoring results are detailed in Part II, Sections B.1 and 2 of the permit, including completion and submittal of Discharge Monitoring Reports (DMRs). The permittee is responsible for conducting all required monitoring and reporting the results to ADEQ on DMRs or as otherwise specified in the permit.

**Electronic reporting.** The US EPA has published a final regulation that requires electronic reporting and sharing of Clean Water Act National Pollutant Discharge Elimination System (NPDES) program information instead of the current paper-based reporting (Federal Register, Vol. 80, No. 204, October 22, 2015). Beginning December 21, 2016 (one year after the effective date of the regulation), the Federal rule required permittees to make electronic submittals of any monitoring reports and forms called for in their permits. ADEQ has created an online portal called myDEQ that allows users to submit their discharge monitoring reports and other applicable reports required in the permit.

Requirements for retention of monitoring records are detailed in Part II.D of the permit.

## **X. BIOSOLIDS REQUIREMENTS (Part III in Permit)**

Not applicable because fish wastes are not considered biosolids under the 40 CFR 503 provisions.

## **XI. SPECIAL CONDITIONS (Part IV in Permit)**

### **Mixing Zone**

A mixing zone for nitrogen and phosphorus has been granted for the duration of this permit. ADEQ evaluated the request and approved the establishment of the nitrogen and phosphorus mixing zone. The factors in the Arizona mixing zones rules listed in A.A.C. R18-11-114(D) were considered upon approving the request.

### **Ambient Monitoring and Reporting**

The permittee shall monitor the flow and ambient surface water quality in Canyon Creek for total phosphorus, total nitrogen, pH and DO. Ambient monitoring shall be conducted quarterly with these events noted: drought, major winter precipitation, snow melt, summer monsoon, and fall precipitation. The downstream ambient monitoring data is required to confirm the mixing model results and to assess if the stream is negatively impacted by the nutrient loading from the hatchery.

### **Best Management Practices**

The permittee shall submit an annual progress report to ADEQ by January 31st of each year which shall include information regarding best management practices implemented.

### **Special Progress Reporting**

The permittee shall submit an annual progress report to ADEQ by January 31st of each year which shall include data collected, information regarding any facility upgrades and/or process improvements, and a list of chemicals used.

### **Permit Reopener**

This permit may be modified based on newly available information; to add conditions or limits to address demonstrated effluent toxicity; to implement any EPA-approved new Arizona water quality standard; or to re-evaluate reasonable potential (RP), if assessment levels in this permit are exceeded [A.A.C. R18-9-B906 and 40 CFR Part 122.62 (a) and (b)].

## **XII. ANTIDegradation**

Antidegradation rules have been established under A.A.C. R18-11-107 to ensure that existing surface water quality is maintained and protected. The discharge of process water from CCFH is to Canyon Creek, a perennial water currently in attainment with the Surface Water Quality Standards. This is a flow-through hatchery and the data indicate that hatchery operations have no impact on the stream integrity with the possible exception of nitrogen and phosphorus. A mixing zone for nitrogen and phosphorus and monitoring requirements have been established under the proposed permit in addition to the applicable standards listed in the rule. Field water quality measurements (pH, DO, % plant cover on the stream bed) taken downstream of the hatchery indicate the stream is healthy and assimilating the nutrient loading from the hatchery. As long as the permittee maintains consistent compliance with the permit limits as prescribed, the designated uses of the

receiving water will be presumed protected, and the facility will be deemed to meet the applicable Tier 2 antidegradation requirements under A.A.C. R18-11-107.

### **XIII. STANDARD CONDITIONS**

Conditions applicable to all NPDES permits in accordance with 40 CFR, Part 122 are attached as an appendix to this permit.

### **XIV. ADMINISTRATIVE INFORMATION**

#### **Public Notice (A.A.C. R18-9-A907)**

The public notice is the vehicle for informing all interested parties and members of the general public of the contents of a draft AZPDES permit or other significant action with respect to an AZPDES permit or application. The basic intent of this requirement is to ensure that all interested parties have an opportunity to comment on significant actions of the permitting agency with respect to a permit application or permit. This permit will be public noticed in a local newspaper after a pre-notice review by the applicant and other affected agencies.

#### **Public Comment Period (A.A.C. R18-9-A908)**

Rules require that permits be public noticed in a newspaper of general circulation within the area affected by the facility or activity and provide a minimum of 30 calendar days for interested parties to respond in writing to ADEQ. After the closing of the public comment period, ADEQ is required to respond to all significant comments at the time a final permit decision is reached or at the same time a final permit is actually issued.

#### **Public Hearing (A.A.C. R18-9-A908(B))**

A public hearing may be requested in writing by any interested party. The request should state the nature of the issues proposed to be raised during the hearing. A public hearing will be held if the Director determines there is a significant amount of interest expressed during the 30-day public comment period, or if significant new issues arise that were not considered during the permitting process.

#### **EPA Review (A.A.C. R18-9-A908(C))**

A copy of this draft permit and any revisions made to this draft as a result of public comments received will be sent to EPA Region 9 for review. If EPA objects to a provision of the draft, ADEQ will not issue the permit until the objection is resolved.

### **XV. ADDITIONAL INFORMATION**

Additional information relating to this proposed permit may be obtained from:

Arizona Department of Environmental Quality  
Water Quality Division – AZPDES Individual Permits Unit  
Attn: Jacqueline Maye  
1110 West Washington Street  
Phoenix, Arizona 85007

Or by contacting Jacqueline Maye at (602) 771 – 4607 or by e-mail at [jpm@azdeq.gov](mailto:jpm@azdeq.gov).

## **XVI. INFORMATION SOURCES**

While developing discharge limitations, monitoring requirements, and special conditions for the draft permit, the following information sources were used:

1. AZPDES Permit Application Form(s) 1 and 2B received October 22, 2015, along with supporting data, facility diagram, and map submitted by the applicant with the application forms.
2. Supplemental information to the application received by ADEQ on December 23, 2015, and a Mixing Zone Application on November 21, 2017.
3. ADEQ files on Canyon Creek Fish Hatchery.
4. ADEQ Geographic Information System (GIS) Web site.
5. Arizona Administrative Code (AAC) Title 18, Chapter 11, Article 1, *Water Quality Standards for Surface Waters*, adopted December 31, 2016.
6. A.A.C. Title 18, Chapter 9, Article 9. *Arizona Pollutant Discharge Elimination System* rules.
7. Code of Federal Regulations (CFR) Title 40:
  - Part 122, *EPA Administered Permit Programs: The National Pollutant Discharge Elimination System*.
  - Part 124, *Procedures for Decision Making*.
  - Part 133. *Secondary Treatment Regulation*.
  - Part 503. *Standards for the Use or Disposal of Sewage Sludge*.
8. EPA Technical Support Document for Water Quality-based Toxics Control dated March 1991.
9. U.S. EPA NPDES Permit Writers' Manual, September 2010.

## APPENDIX A

### Nitrogen Mixing Zone Calculations

#### Nitrogen

N annual mean std = 0.60 mg/L

#### Mixing Zone Solver

$$Q_s C_s + Q_d C_d = Q_r C_r$$

$Q_s$  = Stream flow above point of discharge

$C_s$  = background in-stream pollutant concentration

$Q_d$  = effluent flow

$C_d$  = effluent pollutant concentration

$Q_r$  = resultant in-stream flow after discharge

$C_r$  = resultant in-stream pollutant concentration (after complete mixing occurs)

#### (Cs) Upstream - Annual Average

Year	N (mg/L)	P (mg/L)
2016	0.23	0.06
2015	0.24	0.05
2014	0.21	0.05
2013	0.22	0.05
2012	0.25	0.05
2011	0.26	0.05
Avg	0.24	0.05

#### (Cd) Effluent - Annual average

Year	N (mg/L)	P (mg/L)
2016	0.72	0.13
2015	0.72	0.12
2014	0.76	0.12
2013	0.67	0.11
2012	0.80	0.13
2011	0.64	0.1
Avg	0.72	0.12

#### End of Pipe Limits Calculator

$Q_s = Q_r - Q_d$	2.80 CFS
$C_s =$	0.24 mg/L
$Q_d =$	3.96 CFS
$C_d =$	0.72 mg/L
$Q_r =$	6.77 CFS
$C_r =$	0.60 mg/L

#### \*\*Limit Calculation

$$C_d = ((Q_r C_r - Q_s C_s)) / Q_d$$

$$C_d = 0.86$$

\*\* The Nitrogen limit in the previous permit was 0.85 mg/L, which was an interim limit based on a variance. A variance was not approved in this permit. The mass-balance results of  $C_d$  based on the annual average flow data was 0.86 mg/L. Because the current downstream nitrogen concentration ( $C_r = 0.60$  mg/L) is on average at the standard, ADEQ will cap the mixing zone N limit at 0.85 mg/L - the same limit as in the previous permit.

#### Downstream Test

$$C_r = ((Q_s C_s) + (Q_d C_d)) / Q_r$$

$$C_r = 0.52$$

#### (Cr) 500 Meters Downstream - Annual Average

Year	N (mg/L)	P (mg/L)
2016	0.63	0.11
2015	0.57	0.1
2014	0.67	0.11
2013	0.5	0.08
2012	0.61	0.09
2011	0.61	0.07
Avg	0.60	0.09

#### (Qd) Effluent Flow - Annual Average

Year	(gal/min)	CFS
2016	1784	3.97477
2015	1820	4.054978
2014	1597	3.558132
2013	1989	4.431512
2012	1639	3.651708
2011	1911	4.257727
Avg	1779.1788	3.964028

#### (Qr) Downstream Flow Data ADEQ

Date	CFS
25-Aug-10	6.3
30-Nov-10	3.8
10-May-11	8.1
31-May-17	8.6
14-Aug-17	7.03
Avg	6.77

## Phosphorus Mixing Zone Calculations

### Phosphorus

Phosphorus Annual Mean = 0.12 mg/L

#### Mixing Zone Solver

$$Q_s C_s + Q_d C_d = Q_r C_r$$

$Q_s$  = Stream flow above point of discharge

$C_s$  = background in-stream pollutant concentration

$Q_d$  = effluent flow

$C_d$  = effluent pollutant concentration

$Q_r$  = resultant in-stream flow after discharge

$C_r$  = resultant in-stream pollutant concentration

#### End of Pipe Limits Calculator

$Q_s = Q_r - Q_d$	2.80 CFS
$C_s =$	0.05 mg/L
$Q_d =$	3.96 CFS
$C_d =$	0.12 mg/L
$Q_r =$	6.77 CFS
$C_r =$	0.09 mg/L

#### Limit Calculation

$$C_d = \frac{((Q_r C_r - Q_s C_s))}{Q_d}$$

$$C_d = 0.12$$

\*\* The Phosphorus limit in the previous permit was 0.15 mg/L, which was an interim limit based on a variance. A variance was not approved in this permit. The mass-balance results of  $C_d$  based on the annual average flow data was 0.12 mg/L. Because the current downstream phosphorus concentration ( $C_r = 0.09$  mg/L) is on average below the standard, ADEQ will establish the mixing zone P limit at 0.15 mg/L - the same limit as in the previous permit.

#### Downstream Test

$$C_r = \frac{((Q_s C_s) + (Q_d C_d))}{Q_r}$$

$$C_r = 0.09$$

#### (Cs) Upstream

Year	N	P
2016	0.23	0.06
2015	0.24	0.05
2014	0.21	0.05
2013	0.22	0.05
2012	0.25	0.05
2011	0.26	0.05
Avg	0.24	0.051667

#### Annual average data

(Cr) 500 Meters Downstream

Year	N (mg/L)	P (mg/L)
2016	0.63	0.11
2015	0.57	0.1
2014	0.67	0.11
2013	0.5	0.08
2012	0.61	0.09
2011	0.61	0.07
Avg	0.60	0.09

#### (Qd) Effluent - Annual Average

Year	Flow (gal/mi CFS)
2016	1784 3.97477
2015	1820 4.054978
2014	1597 3.558132
2013	1989 4.431512
2012	1639 3.651708
2011	1911 4.257727
Avg	1779.2 3.96

#### (Cd) Effluent - Annual average

Year	N	P
2016	0.72	0.13
2015	0.72	0.12
2014	0.76	0.12
2013	0.67	0.11
2012	0.80	0.13
2011	0.64	0.1
Avg	0.72	0.12

#### (Qr) Flow Data

Field	
25-Aug-10 FLOW	6.3 CFS
30-Nov-10 FLOW	3.8 CFS
10-May-11 FLOW	8.1 CFS
31-May-17 FLOW	8.6 CFS
14-Aug-17 FLOW	7.03 CFS
Avg	6.77